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Report on School Building Programs in Canada

Prepared by
John Wimbs MRAIC ARIBA
Education Facilities Consultant

In conjunction with
the Division of School Planning & Building Research
Ontario Department of Education

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REPORT ON SCHOOL BUILDING PROGRAMS IN CANADA

Preface

As mentioned in the original report, dated March 14, 1967, responsibility for education in Canada is purely a provincial one. However, since the preparation of that report, a permanent Canadian Council of Education Ministers has been formed.

The purpose of the Council is to foster inter-provincial co-operation in education and promote the development of education as a national priority.

The new Council, under the Chairmanship of the Honourable W. G. Davis, Ontario Minister of Education, will encourage inter-provincial co-ordination of such matters as educational planning and development, exchange of research information, educational television, teacher exchange and economic studies relating to education.

Under the auspices of the Canadian Education Association, the Ministers of Education first began their annual meetings with the designation of a Standing Committee in 1960. The urgency for more frequent meetings and a formal organization arose out of such problems as the implementation of national programs of manpower training and development in conjunction with the Federal Government.

At the annual meeting of education ministers held in 1966 at Vancouver, an Ad Hoc sub-committee of five ministers was appointed to investigate the possibilities

of establishing a permanent council. Their recommendations were put forward at a meeting of all the ministers in Toronto in January of this year.

At another Toronto meeting in June this year, the ministers of education agreed to the establishment of the Council. Their proposal was subsequently ratified by the ten Provincial Governments.

The provinces will provide funds for the setting up and maintenance of the secretariat on a per capita basis. Ontario's share, 34 per cent, will be the largest. On behalf of the Ontario and Quebec departments of education, the Hon. William Davis and the Hon. Jean-Jacques Bertrand have offered special assistance toward the immediate initial establishment of the secretariat through contributions of facilities and the secondment of senior technical staff.

A progressive spirit of co-operation therefore marks this new era in which the exchange of ideas, research and information on school building programs between the provinces will help establish more economical, functional and aesthetically pleasing schools across the country.

The form of this report is therefore based on the Organization for Economic Co-operation and Development recommendation DAS/EID/66.59 (1st revision) with the understanding that a clearer picture of the Canadian School Building Program will emerge when the Secretariat of the

Council of Ministers is fully operational.

On this understanding, only the first section (Part I, Levels of Investments) refers to the National Scene, and the more detailed information is given under the sections devoted to Provinces.

In the light of the foregoing, this report is respectfully submitted to the Organization for Economic Co-operation and Development.

GENERALLY

Over 433,000 more pupils enrolled in elementary and secondary schools in 1967-68 than during 1964, with close to 6 million enrolment by 1971.

Elementary and secondary institutions in Canada numbered 21,799 in 1966.

Total expenditure on formal education to rise from over $4.4 billion in 1966 to $5.5 billion by 1971.

Expenditure of $3.5 billion on elementary and secondary education for 1966-67 shows $3 spent on elementary and secondary for every $1 spent on higher education.

School population doubled from 1950-60 to 5.4 million with one million increase expected between 1965-75. Secondary school enrolment rises from 1.21 million, 1965-66, to 1.70 million during 1975-76. Secondary enrolment ratio to be 92% of 14-17 age group by mid-1970's.

All government outlay for education to rise by more than 25% between 1966-70. Total formal education expenditure, as share of Gross National Product, rose to 6.65 in 1966 from 4.57 in 1960.

Ontario estimates 143 new secondary schools to 1976 or 2.12 classrooms daily for nine years; about 400 more elementary classrooms annually until 1971.

Note:
Figures and statistics generally obtained from The Dominion Bureau of Statistics, Maclean Hunter's Research Bureau and "Quick Canadian Facts".

GROSS NATIONAL PRODUCT %'S

Expenditure on Formal Education, Vocational Training and Related Cultural Activities and Forecasts to 1975:

	Expenditure ($000's)	Share of Gross National Product
1954	728,900	2.93%
1955	826,800	3.05
1956	928,500	3.04
1957	1,110,300	3.48
1958	1,264,400	3.84
1959	1,458,600	4.18
1960	1,656,900	4.57
1961	1,912,600	5.10
1962	2,345,800	5.78
1963	2,485,194	5.72
1964	2,870,400	6.06
1965	3,352,900	6.43
1966	3,840,900	6.65

Expenditure as a share of G.N.P. has been rising steadily. The following forecasts are based on the 1963-1966 share of G.N.P., projected to M-H Research Bureau's forecasts of G.N.P. to 1975:

	Estimated Expenditure (million $)
1967	4,156
1968	4,462
1969	4,793
1970	5,148
1971	5,528
1972	5,934
1973	6,419
1974	6,895
1975	7,398

1966-67 ESTIMATES OF EDUCATION

	No. of Institutions	No. of Students	No. of Teachers
Public elementary and secondary	18,947	5,207,000	212,410
Private elementary and secondary	1,325	194,480	12,312
Federal Government schools	466	46,870	2,324
Technical-vocational	78	31,015	2,415
Teachers' colleges	880	19,600	1,400
University faculties of education (1)	30	20,000	975
Universities, colleges, affiliates	375	234,000	18,000

(1) These figures are included in "Universities, colleges, affiliates"

ESTIMATED OPERATING EXPENDITURE FOR 1967

Public elementary and secondary schools	$3,005,500,000
Private elementary and secondary schools	92,600,000
Teachers' colleges	20,000,000
Higher education (including $350,000,000 capital costs)	1,098,000,000
Other formal education	1,500,000
Total academic education	4,217,600,000
Technical-vocational	214,000,000
TOTAL FORMAL EDUCATION	4,431,600,000

*DBS

NUMBER OF SCHOOLS

Data on the number of schools has only been available in relatively recent years. Based on the available information it is apparent that the actual number of schools has been decreasing, in spite of the rapidly increasing values of construction on schools. This paradox is easily explained. As urban areas have mushroomed into suburban developments, large numbers of small schools in these areas have been closed because modern large elementary and secondary schools have been constructed. Also, the population movement to the suburbs necessitated the closing of schools within the inner core of cities, due to lack to pupils to sustain these schools.

In the 1958-59 school year there were 27,578 publicly-controlled elementary and secondary schools in Canada. By 1960-61, the number had dwindled by 1,974. The most recent figures available, for 1965-66, indicate that publicly-controlled elementary and secondary schools now number 21,799, a reduction of 5,779 over the 1958-59 school year. During this same period, the number of private elementary and secondary schools increased slightly from 1,174 to 1,327.

Elementary and Secondary Schools in Operation, 1965-1966

	Publicly Controlled	Private	Other*	Total
Nfld.	1,216	3	-	1,219
P.E.I.	413	2	1	416
N.S.	972	21	6	999
N.B.	1,100	12	8	1,120
Que.	4,550	810	37	5,397
Ont.	6,233	230	96	6,559
Man.	1,550	55	72	1,677
Sask.	1,363	16	68	1,447
Alta.	1,200	38	30	1,268
B.C.	1,390	140	72	1,602
Other areas**	26	-	69	95
Total Canada	20,013	1,327	459	21,799

* Other includes schools operated by the Federal government for the Indians throughout Canada; in the Arctic and overseas for servicemen's dependents. Does not include 21 schools for the blind and deaf.

**Other areas include Yukon, Arctic and overseas.

ENROLMENT - FULL-TIME STUDENTS

	Elementary Grades	Secondary Grades	Total
1960-61	3,319,450	882,247	4,201,697
1961-62	3,406,226	1,003.883	4,410,109
1962-63	3,490,093	1,098,696	4,588,789
1963-64	3,594,215	1,192,883	4,787,098
*1964-65	3,775,353	1,191,941	4,967,294
*1965-66	3,794,570	1,329,825	5,124,395
*1966-67	4,010,941	1,255,922	5,266,863
1967-68			5,400,000
1968-69			5,520,000
1969-70			5,650,000
1970-71			5,775,000

* Estimated by Dominion Bureau of Statistics

Full-time Enrolment in Technical, Vocational and Composite High Schools

	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Total
1959-60	346	132	1,172	4,734	22,900	54,019	2,116	4,120	10,697	7,384	107,625
1960-61	434	130	861	4,706	17,069	61,049	3,957	4,543	10,990	8,020	111,759
1961-62	503	140	905	4,528	21,429	70,751	4,139	4,900	11,280	8,620	127,195
1962-63	475	165	916	5,500	21,226	95,834	4,653	5,359	6,890	11,394	152,412
1963-64	366	491	1,636	7,696	21,473	132,175	4,801	9,014	11,471	12,412	201,535
1964-65	421	528	1,970	8,861	22,695	158,085	5,130	5,976	12,962	8,556	225,184

Full-time Enrolment in Post Secondary Technical Courses

	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Total
1960-61	-	-	30	61	5,107*	3,083	-	105	911	146	9,443
1961-62	-	-	32	78	5,712*	3,959	-	168	1,032	197	11,178
1962-63	-	-	34	149	5,924*	3,990	-	218	1,154	202	11,671
1963-64	42	-	76	207	6,977	4,743	294	316	1,687	150	14,492

*In addition there were 2,473 full-time students enrolled in one-year preparatory courses leading to post secondary technical courses in 1963-64; in 1962-63 2,248; in 1961-62 2,041 and in 1960-61 1,979.

Source: DBS

CAPITAL AND REPAIR EXPENDITURES

SCHOOLS (excluding universities)

(millions of dollars)

	Capital Expenditures		Repair Expenditures		Capital & Repair Expenditures		
	Construction	Machinery & Equipment	Construction	Machinery & Equipment	Construction	Machinery & Equipment	TOTAL
1958	201.9	20.8	21.6	3.4	223.5	24.2	247.7
1959	213.5	21.6	18.8	3.6	232.3	25.2	257.5
1960	229.6	25.9	29.4	5.4	259.0	31.3	290.3
1961	223.1	29.9	30.4	6.7	253.5	36.6	290.1
1962	402.4	48.8	29.1	6.8	431.5	55.6	487.1
1963	425.1	51.4	24.8	6.5	449.9	57.9	507.8
1964	289.3	49.4	25.0	8.8	314.3	58.2	372.5
1965	423.4	63.7	30.4	7.0	453.8	70.7	524.5
1966	512.9	78.4	32.4	6.7	545.3	85.1	630.4
1967	597.8	84.5	36.0	8.1	633.8	92.6	726.4

Source: DBS 1958-1965 - actural
1966 - preliminary
1967 - intentions

POPULATION ESTIMATES

as of June 1 each year (000's)

	Census											
	1956	1961	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Nfld.	415	458	493	502	509	516	522	529	536	543	548	556
P.E.I.	99	105	109	109	110	111	111	112	113	114	115	116
N.S.	695	737	756	757	762	766	770	773	775	779	782	785
N.B.	555	598	617	620	624	628	632	636	639	643	646	650
Que.	4,628	5,259	5,781	5,868	5,980	6,100	6,220	6,320	6,450	6,560	6,660	6,780
Ont.	5,405	6,236	6,961	7,140	7,300	7,440	7,620	7,880	7,970	8,140	8,340	8,560
Man.	850	922	963	969	975	980	984	987	990	992	995	997
Sask.	881	925	955	960	964	968	973	975	977	981	984	987
Alta.	1,123	1,332	1,463	1,489	1,526	1,552	1,559	1,630	1,654	1,710	1,755	1,790
B.C.	1,399	1,629	1,874	1,946	2,010	2,070	2,140	2,205	2,270	2,330	2,390	2,460
Yukon & N.W.T.	31	38	43	44	46	47	48	49	51	53	56	59
TOTAL CANADA	16,081	18,238	20,015	20,404	20,806	21,178	21,579	22,096	22,425	22,845	23,271	23,740

Estimates 1967-1975 prepared by M-H Research Bureau.

Report on School Buildings in Ontario

INTRODUCTION

Today, Ontario is the most highly urbanised of Canada's Provinces, and the following notes give an indication of the economic situation in the Province today.

Ontario, which covers 413,000 square miles near the heart of the North American continent, is the second largest of Canada's ten provinces. Economically, it is Canada's most important province. Ontario's close to 7,000,000 people make up slightly more than a third of Canada's total population. The productivity of its industries enables the province to produce 40 per cent of Canada's net value of commodities. It is not surprising then, that the personal income of Ontario residents is 40 per cent of that of the Canadian people as a whole. In other words, Ontario residents earn a higher share of the national income than their numbers would indicate.

Among the chief factors accounting for the economic growth of the province have been its geographic location and its natural resources. Ontario is not only close to the major North American population centres but it has an outlet to the Atlantic Ocean via the St. Lawrence Seaway, which means it has access to both continental and world markets. A key location makes it economically feasible for full use to be made of the province's rich resources. With its minerals, forests, rich farmland, and water resources,

Ontario has a natural advantage in many areas of economic activity. More than a quarter of the value of Canadian mineral production is contributed by Ontario, and a similar proportion of Canada's agricultural production.

It is in manufacturing, however, that Ontario has the biggest advantage over most of the other provinces. A third of the manufacturing establishments in Canada are located within the province's boundaries. These firms in 1964 were responsible for 50.3 per cent of the nation's total shipments of manufactured goods. Clearly, Ontario is a leading manufacturing province in Canada.

Report on School Building in Ontario

Part I

Level of Investments in School Building

Appendix A shows the extent of elementary and secondary school construction, completed from 1946 to 1965. With School Boards in Ontario being autonomous, and with the Provincial Government paying a portion of the "approved cost", the costs of school buildings are shown as "estimated" but can be regarded as a fairly accurate statement of the gross costs of completed projects.

Appendix B shows the estimated expenditures for elementary and secondary buildings over the 4-year period 1966 to 1969, and Appendix C indicates Gross National Product statistics.

In addition to these costs, the Province gives financial support to schools for the Deaf and Blind, Teachers' Colleges, Colleges of Applied Arts and Technology and University Buildings.

APPENDIX A

SCHOOL BUILDING CONSTRUCTION, 1946 - 1965

SCHOOLS - NEW AND ADDITIONS

ELEMENTARY

Year	Increased Enrolment	Number of Projects	Additional Pupil Places	Estimated Cost $
1946	7,294	89	6,500	2,600,000
1947	7,773	132	11,400	6,100,000
1948	21,424	155	18,400	10,900,000
1949	21,267	190	22,500	16,400,000
1950	19,456	198	27,300	17,500,000
1951	42,324	241	31,000	21,300,000
1952	58,386	217	40,740	29,600,000
1953	55,605	303	45,675	33,200,000
1954	53,239	396	57,400	33,700,000
1955	41,878	425	63,000	39,300,000
1956	48,282	379	60,100	37,700,000
1957	59,221	417	64,480	43,950,000
1958	56,481	451	74,735	51,085,000
1959	54,051	427	73,605	56,672,000
1960	44,739	529	78,750	59,938,000
1961	36,665	452	66,150	53,301,000
1962	33,976	395	58,500	50,704,000
1963	36,135	412	66,730	58,707,000
1964	45,309	457	77,385	71,145,000
1965	41,570	480	84,280	84,497,000
Total	785,075	6,745	1,028,630	778,299,000

APPENDIX A

SECONDARY

Year	Increased Enrolment	Number of Projects	Additional Pupil Places	Estimated Cost $
1946	5,740	9	670	303,000
1947	1,064	19	1,490	539,000
1948	3,159	27	4,240	4,470,000
1949	2,159	19	4,810	7,577,000
1950	3,822	29	8,850	13,142,000
1951	2,341	29	7,020	8,631,000
1952	7,535	31	10,240	14,240,000
1953	6,458	43	10,750	16,891,000
1954	12,617	58	13,880	17,698,000
1955	14,396	56	14,750	20,217,000
1956	11,043	46	14,080	17,285,000
1957	17,920	66	22,890	29,209,000
1958	18,550	58	18,750	26,081,000
1959	15,501	71	18,510	25,193,000
1960	25,199	72	26,480	39,169,000
1961	36,402	62	19,520	31,941,000
1962	32,401	105	36,730	82,114,000
1963	32,632	174	66,650	181,611,000
1964	31,091	46	17,430	40,023,000
1965	23,437	69	16,972	59,581,000
Total	301,339	1,089	334,712	635,906,000

Notes: 1. Enrolment increases are calculated on September enrolments.

2. Building projects are counted in the year of completion.

3. No account is taken in this table of pupil-places lost as a result of the following factors: shift from urban to suburban areas, fire losses, replacement of temporary and obsolete accommodation, and abandonment of small buildings to permit centralized facilities.

Source: School Plant Approvals Office

Part II

Administrative and Financial Background to School Building

The principal sources of revenue for Ontario schools are local taxes and Provincial grants. School Finance details, a History of Ontario Education and Administration details are contained in "The Organisation and Administration of Public Schools in Ontario", available from the Dominion Bureau of Statistics, Education Division, Ottawa, Ontario.

The Ontario Public Schools Act and the Secondary Schools and Boards of Education Act provide, in effect, that the annual cost of proposed expenditure from current revenue for certain categories of "permanent improvements" (within which is included all building work) must not exceed two mills in the dollar upon the relevant assessment and the excess of any such expenditure must be approved in the manner for approving the issue of debentures. Whether or not building approvals are subject to grant, the Ontario Municipal Board will not give its approval to an Education building project unless final approval has been given by the Department of Education.

The Approval Procedures for General Legislative grant purposes for new schools, additions, and renovations involves the local board, the board secretary, school board inspector, the area superintendent, the Department of Education main office and the School Plant Approvals office. These Procedures ensure that any building proposal receives the attention of specialists in various fields and that the school building will be built to best suit the needs of the board, the teacher and the student.

The procedures for requests and approvals for legislative grants towards the capital cost of work in connection with school buildings has recently been completely revised so that the approved cost will now comprise elements towards the cost of:-

(i) the net cost of construction

(ii) yardworks, landscaping and athletic fields

(iii) contingencies

(iv) architects fees

(v) furniture and equipment

Details of these new procedures can be obtained from the Ontario Department of Education.

Part III

Research and Development (in lieu of National Bodies)

A number of agencies are active in Research and Building Approval procedures in the Province of Ontario, particularly the following:-

(i) Division of School Planning and Building Research, Ontario Department of Education.

(ii) Study of Educational Facilities by the Metropolitan Toronto School Board.

(iii) The School Plant Approvals Office, Ontario Department of Education.

(iv) Various major school boards in the Province.

A brief summary of the work of such groups are as follows:-

(i) Division of School Planning and Building Research

This Division of the Ontario Department of Education commenced operations in October 1964 and its function is to develop a program of research and investigation into all aspects of the construction of school buildings.

The program includes investigating facilities necessary to house new teaching aids, researching school costs, providing a consultation service to school Boards, educators, architects and engineers, co-ordinating the Department's post-secondary building program with the Department of Public Works and associated architects and organizing committees of specialists on the subjects of -

(a) School Planning

(b) Heating, Ventilating and Air-Conditioning

(c) The combined use of community facilities

(d) Construction Quality

This office is presently organizing the ninth regional workshop on school design. This type of workshop attracts school trustees, taxpayers, and all the members of the school planning team to an environment that is conducive to the exchange of ideas.

A conference was also held in September this year on the subject of Community Colleges.

The head of the Division of School Planning acts as secretary to the Minister's Advisory Committee on School Planning. This Committee was set up in December 1964 to keep the Department informed on all factors which affect school design under rapidly changing conditions. One important practical outcome of the Committee's work was the initiation by the Metropolitan Toronto School Board of a research project on Component school construction. (SEF)

A number of brochures have been produced by the Division of School Planning and Building Research, with the idea of providing information on the functional and economical requirements of various school facilities. The information contained in the brochures is offered merely as a suggestion and it is hoped that school boards and their architects will use the information purely as a guide and as a basis for creative ideas to suit their own special needs. Copies of the School Planning Brochures on Site Development (K-6) and Community College Planning are attached together with typical hypothetical plans that will be published in future brochures when approved.

(ii) Study of Education Facilities (SEF)

The study of Educational Facilities by the research group of the Metro Toronto School Board is now being co-ordinated with that of the Montreal Group (see separate report) to form the largest and most expensive undertaking of its kind in Canada.

(iii) The School Plant Approvals Office

This office is concerned with the scrutiny of all school building projects on behalf of the Department and the Government of Canada when Federal aid projects are involved.

The review process embraces each grant aided school building project in the Province, from the original submission by a local school board to construction.

The SEF Group presently has a budget of $600,000 for Academic and Technical Research and it is hoped that by January 1968, approval will have been given to increase the budget substantially. A prototype component system building is due for construction start by July 1969 with completion in April 1970. This will be a 3 storey, 1,000 pupil, elementary school in Toronto. The first school of a 27 school program will commence construction in mid-September 1969 with completion scheduled for June 1970.

An outline of the objectives and program of the SEF Group is given in the following:-

The Metropolitan Toronto School Board
Study of Educational Facilities (SEF)
Objectives

Because of constant change and stress now being placed on the importance of individual learning, concepts such as continuous student progress through non-grading and more flexible scheduling, and variable instruction techniques such as team teaching in flexible learning spaces are rapidly gaining favourable consideration by educators. As well, the need for improved information retrieval in enlarged library and material resource centres and the increased application of technological and audio-visual equipment as instructional aids are becoming very important in the educational scene.

Education is becoming more flexible in its aims, more experimental in its techniques. SEF is concerned with the problem of rendering compatible existing and new school plant with the growing experimental flexibility of education.

In turning to the mass production potentials of the manufacturing industries, it is hoped to harness both higher quality and faster production at costs which are lower or comparable to those of traditional school construction.

In September, the SEF Group published a report, part of which is attached as Appendix D. These Chapters, entitled, "Quality Education for an Era of Change" and "The Functional School and the Ceiling Cost Formula" give a good idea of the scope of the project, space and budget requirements.

Mr. Rod Robbie, Technical Director of the SEF Program gave his kind permission to reproduce these Chapters. Copies of the full report and further information on the SEF Project can be obtained by writing to Mr. Robbie at:-

The Metro Toronto School Board,
Study of Educational Facilities,
175 College Street,
Toronto 2B, Ontario.
Canada.

PROGRAM SEF

NOTE: - A school building and reconstruction program of approximately 70 million dollars per year is anticipated for the Metro Toronto area for the next 10 years.

1. Defining the evolving trends in the educational process.

2. Defining the general and detailed functional and environmental requirements of these trends.

3. Examining the cost implications of the functional and environmental satisfaction of the educational trends.

4. Evolving a format for academic specifications, whereby the requirements of individual educational facilities may be defined with sufficient clarity to permit and encourage creative solution of the problem of architectural enclosure.

5. Isolating and defining areas in the overall educational process where research, re-evaluation, re-training and other evolutionary changes are needed.

6. Defining the aesthetic, spiritual and dimensional criteria for new educational facilities and developing a format for the presentation of these guidelines for individual projects. It is proposed that these criteria treat mandatory requirements on a "per pupil" basis, while leaving maximum spatial freedom, within desirable environmental criteria, to the individual architect.

7. Preparing technical performance specifications for educational facilities.

8. Assisting in the development of individual educational facility projects using current building techniques through the medium of the design criteria, academic and technical performance specifications.

9. Initiating the evolution of "open" building component systems with interface compatibility by the Building, Materials and Systems Industries within the parameters of the design criteria, academic and technical performance specifications.

10. Conducting a program of school construction through the medium of the current building design and job management process so far as this is meaningful in the context of an "open" integrated building components system.

11. Providing to the Advisory Committee of SEF and through them the Metropolitan Toronto and its Constituent School Boards the findings of the research in the form of Interim Studies, for consideration in connection with the on-going program of school construction in Metropolitan Toronto.

12. Monitoring and reviewing the executed phases of the study and revising the design control documents.

13. Phasing future system bids and extending research studies initiated.

14. Publishing the consolidated findings of the study.

This study therefore is seen both as a vital element in the fabric of education in Metropolitan Toronto, and as a planned contribution to the evolution of the building industry and education as a whole.

CHAPTER VI

QUALITY EDUCATION FOR AN ERA OF CHANGE

Introduction

The user requirements for K-6 elementary schools in Metropolitan Toronto are outlined in the later sections of this Chapter and are presented in detail in Part III of our Report. These requirements are based on our stated assumptions regarding the objectives and processes of elementary education described in Chapters I to IV of Part I of the Report. The requirements are also stated in relation to our understanding of current trends in elementary education, as given in Chapter V, and our estimates of the extent to which they are likely to be implemented at the K-6 elementary school level in Metro.

We are greatly indebted to many educators in Metropolitan Toronto who assisted us in arriving at many of our conclusions. Some twenty-two educational committees, representative of every level of educator in each borough of Metropolitan Toronto, met regularly from February to June, 1967, for the purpose of helping us to formulate the future educational needs of our elementary schools. While we are indebted to these committee members for much information and many suggestions, we of the Study of Educational Facilities assume fundamental responsibility for our Report.

The user requirements are our best estimates of the facilities required to house education today and in the immediate future. We are well aware of the risks of specificity in a rapidly changing world, but

we realize that school needs must be stated with some degree of concreteness if our work is to have any utility. In presenting these requirements, therefore, we must emphasize that they are not intended to be "the final word." They will remain usable only if they are subject to frequent, if not continuous, review and revision.

Premises of the Statement of Requirements

The Scope of Current Societal Change

One predominant characteristic of life today is the accelerating rate of change. We are rapidly moving away from the static concepts of the nineteenth and early twentieth centuries with their prescriptive codes, traditional values, and fixed modes of conduct. Preserving the status quo will not solve our pressing social, moral,technological,and political problems. The eighteenth and nineteenth century revolutions in industry and agriculture helped man conquer his physical environment. From a dependence on muscle and brawn, man moved into an era in which machines would do his heavier work. Today, we are entering an age of cybernation in which we will undoubtedly encounter social changes on levels which are even more profound.

"Mind-power," not "manpower," is the new challenge facing our civilization. A central paradox of the cybernetics revolution seems to lie in the fact that by means of the computer we are enabled both to treat other human beings collectively to an extent never before possible and, at the same time, to treat them individually to an extent never before possible. The hard distinction between the individual and the society is now seriously questioned; involvement, participation, and interaction are emphasized instead.

There is evidence of rapid change also in the crumbling of

many traditional attitudes, the rejection of political creeds based on slogans, the leavening of social classes, and the very gradual decline of our belief in authoritarian educational practices.

The implications of these changes for education, already noted, constitute a major premise of our statement of user requirements.

Reorientation of Public Education

Despite the extent of recent and current societal change, the schools retain many ties with the past. Our public education system was born in the nineteenth century during the throes of the industrial revolution. Rote memorization, regimentation, and harsh discipline were some of the worst features of its early years. Although in very recent decades more concern for the individual has appeared, we are still trapped to some extent by over-reliance on some traditional procedures. We lean too often, for example, on "telling," perhaps because it is our accustomed way of instructing a standard-sized group of pupils in a traditional-sized classroom. In fact, the accepted manner of describing a school today is by the number of classrooms in contains. Each classroom represents a cellular order of space (for the designer) and a unit of educational organization (for the teacher and pupils). Our schools, both in organization and design, are like egg crates. Too much emphasis is placed on collectivities, not enough on persons.

Society now requires a new type of person. Future educational emphasis will be not so much on the quantity of facts we know as on our ability to locate, judge, and use our facts. Those who are quick to learn new procedures, quick to understand changing processes, and prepared to learn on a continuous and even formal basis throughout their lives are the ones who will have most to offer an employer. The

individual most in demand will be the one with a keen and flexible mind. Also, as automation and technological innovation reduce the length of man's traditional work day or work week, the wise and creative use of leisure time by large segments of our population will become increasingly important. In the near future, man's greatest reward may no longer be economic but rather psychological--the pleasure derived from his involvement in creative work and from his encounter with new problems. In education, the stress will be on the processes of thinking, learning,and creativity.

The Linking of Educational Theory and Practice

One of the basic premises of SEF is that the school system should reflect, as soon and as fully as possible, the implications of relevant, valid, reliable research. In order to achieve this state of affairs, many conditions must,of course,be met. To date, one of the reasons for the gap between theory and practice has been the high cost of remodelling physical facilities to accommodate innovative practices. We believe that facilities recommended as user requirements should literally FACILITATE the implementation of educational innovations. Research evidence and rationales for the more significant educational trends (innovations) were presented in Part I of this report. The following brief review of Part I is intended to emphasize the relevance of theory and research to the planning of facilities and the extent to which the process of synthesizing from the literature (Part I) has had an influence on our committee deliberations and contributed directly to the formulation of user requirements.

As objectives for elementary school education,indeed for all levels of public education, we believe three are paramount. Public

education should provide for the individual needs of each child, should accommodate current societal demands,and should disseminate knowledge and promote its development.

In the chapter on the learning process, we have stressed that learning is a personal process,and that our schools,therefore, should provide greatly increased opportunities for individual learning. Because learning is also accumulative, we should develop organizational arrangements which assure the continuous progress of each individual child in a nongraded setting. Because learning is a unified process, we shall need a vertically and horizontally integrated curriculum. Furthermore, learning is a natural and purposeful process dependent upon interaction between the child and his environment. Teachers must be given every opportunity to encourage such interaction.

Certain curriculum trends are very evident today. School curricula are increasingly focusing attention on the processes of learning and the structure of subjects, rather than on content as such. Curriculum builders are also concerned with integration across traditional subject lines. Further, it is now well accepted that the curriculum should be so organized that the needs of each individual child are provided for in a continuous fashion. The open-ended curriculum of the future will emphasize interrelatedness and process rather than stable compartmentalization.

Developments in technology and freer organizational arrangements are contributing to the evolution of the teacher's role. The trend is away from routine instruction of classes of conventional size and toward guiding and tutoring individuals and small groups.

Modification of teacher preparation and in-service programs is necessary to ensure that teachers have the competence and adaptability

to meet these challenges. Ultimately, if is the teachers who must blend the various educational approaches in such a way as to maximize learning for each child.

The teacher is, at present,the crucial link in the chain of innovation. Unless teachers understand and implement new practices, there is little chance that these practices can help students learn. The potential benefits of such enterprises as continuous progress plans and co-operative teaching and of many developments in the field of educational technology must otherwise be lost.

Educational Function and Design Form

Another premise of our Study is connected with the relation between educational function and design form. The educational processes to be housed in the schools of tomorrow may be likened to the endless dividing, joining,and re-grouping of living micro-organisms, where the underlying order is that of organic life,rather than the simpler mathematical order of the crystal. The school of the past suited its role of housing educational groups which were organized on a simple, geometrical plan. Hence, it was divided into static subdivisions. The school of the future must,like the processes it houses, permit mutation and re-grouping of its interior and exterior spaces in response to a continuous process of change. Over a decade of operation, a school may be required to undergo many interior spatial changes in order to accommodate changing educational requirements.

Nor should the validity of the process of continuous renewal common to all life be overlooked in school construction practices. The concept of built-in obsolescence, at present anathema to educators and designers alike,is one which may eventually be accepted, if the schools

of tomorrow are not to adopt a new form of status quo in which building components are required to have a life out of line with the rate of technological change.

If we are to be rational, acceptance of the concept of change is mandatory. Permanence in educational methodology is unlikely, and the design of the buildings housing education must therefore permit easy, economical, and flexible interior space changes. The prime preerequisites of future school design may be summarized as follows:

1) sufficient space for organic educational processes to achieve optimum performance,

2) appropriate spatial and environmental flexibility to make possible optimum learning performance,

3) an aesthetic and psychological environment based on the nature and learning needs of the individual child,

4) provision of the above prerequisites within the developing economic framework of society.

Education,then, as a fluid process, will require mutating forms of space.

The Relation of Function and Cost

SEF was not established to develop "pie-in-the-sky" prescriptions for school facilities. On the contrary,it is charged not only with the responsibility of specifying what facilities are now required for quality education but also with the responsibility of recommending an economical method for obtaining these facilities.

Our problem, initially,was to decide which of the two criteria—requirements or cost—should be treated as primary. Our solution was to take requirements as our starting point but continually to keep costs in

mind. Where our stated requirements cannot be immediately attained, we propose them as realistic goals—realistic in light of the expanding economy of Metro and in light of the fact that the educational utility of the school over the full life of the building must be considered whenever initial costs are being scrutinized.

The remainder of this chapter is devoted to a summary of the user requirements which will be elaborated in Chapters VIII through XIV.

User Requirements for K-6 Elementary Schools in Metropolitan Toronto

Before dealing with the interior space requirements of these schools, it is appropriate to comment on the desirable size, location, and site requirements of a K-6 elementary school.

Desirable Size (Pupil Enrolment)

Professional opinion in our elementary school committees was virtually unanimous in recommending that elementary (K-6) schools should be community oriented and that they should accommodate enrolments of about 550 to 825 pupils.

It was felt that enrolments well below about 550 pupils (of 300 to 400 pupils) might not adequately support desirable innovative educational practices such as nongrading, co-operative teaching, and many other techniques designed to individualize learning opportunities. Furthermore, very small elementary schools raise, by a disproportionate amount, the cost of school construction. Like larger schools, the smaller school requires the basic ancillary, administrative, and service facilities, with the result that on a per-pupil basis the smaller school is more costly. Also, the Ceiling Cost Formula operates less generously in ancillary and service area allotments in the case of smaller schools.

At or near an enrolment of 825 pupils, however, elementary (K-6) school principals feel that they begin to lose contact with pupils, parents, and the work of the teachers. There is much merit in this viewpoint, since in elementary schools the principal has traditionally served as teacher, administrator, guidance counsellor, and innovator. Often, his vice-principal is engaged in teaching nearly full-time. The school is rarely assigned a full-time guidance counsellor, despite the need for early diagnosis of learning difficulties or social maladjustment. Frequently, and sometimes with good reasons, principals are disinclined to permit co-operating groups of teachers to develop curricular innovations in which the teachers, and not the principal, would determine the individual pupil's achievement levels and his rate of progress through the curriculum. However, if the principal were able to delegate responsibility to a guidance counsellor, and if he were provided with increased assistance from his vice-principal, he would very likely find it less essential to know the individual needs of every pupil. Probably he would be less reluctant to widen the base of responsibility. A larger pupil enrolment approaching 825 pupils would then appear desirable to principals as a means of providing themselves with fuller opportunities for introducing and measuring innovative educational practices.

An elementary (K-6) school ultimately accommodating up to 825 pupils thus appears to offer potential educational advantages, considerable economies on a per-pupil cost basis, and (owing to the Ceiling Cost Formula) larger and more varied ancillary and service space allotments.

Location and site characteristics are also relevant, of course, in determining the optimum size of a particular school.

Location of Elementary K-6 Schools

The ages of elementary school children dictate that a K-6 elementary school be closely identified with its community. It should be located in a quiet zone within a one-mile radius of the homes of its children. Even this radius will vary depending on the nature of the housing, the density of population, and the economic status of the parents. It must also be located in relation to other existing and planned elementary and senior schools so that it serves the overall educational objectives of the borough. Preferably, children should not have to cross busy traffic arteries to reach the school. Effort should be made to avoid airport traffic patterns. A location free from dust, noise, and fumes, and away from busy industrial or business districts is preferred. Finally, the school site should offer easy access by foot, car, and bus.

Site Requirements

It is obvious that the selection of most school sites in Metropolitan Toronto has been characterized by compromise between what school officials would like to have had and what practical circumstances have dictated. In Chapters XI and XIV, we intend to present more fully our views and recommendations concerning outdoor education and the need for greatly improved utilization of school grounds.

At this point, however, we do urge consideration of the principle that a school site should fulfil not only the educational needs of its pupils but also a number of the recreational needs of the people living in the area served by the school. There are some excellent examples, within Metropolitan Toronto, of enlarged school sites which have been

jointly financed by school boards and civic authorities. In such cases the site serves both school and community needs.

The trend towards larger, better developed, and more widely used elementary (K-6) school sites is frustrated in Metro by a number of factors. Many existing sites in built-up areas are too small; the cost of enlarging these at prevailing land prices is extremely high. Further out, in expanding suburban subdivisions, rapidly increasing land values have caused a very great increase in the purchase price of new sites of desirable size. Population shifts, both in the city's inner core and in suburban areas, create pupil population booms which render formerly adequate school facilities completely unsatisfactory. When school buildings are enlarged, or where portable classrooms are added to accommodate increased enrolments, the size of the school playground is decreased somewhat in actual size and quite dramatically on a per-pupil basis. In addition, an expanding transportation system has brought noise and traffic hazards to many previously satisfactory sites. Although there are excellent examples of civic authorities and school boards co-operatively planning for improved school sites and agreeing to share costs, a lack of co-ordinated long-range planning among different levels and departments of civic government has often presented obstacles.

School sites should be planned for future as well as present needs. Officials responsible for site selection should acquire knowledge of present and future community development, so that their school site selection and development will be part of a co-ordinated community plan. Where possible, school sites should be selected with the co-operation of civic parks officials and located adjacent to parkland and wooded ravines. An ample school site, with sufficient provision for further growth, should be selected and allocated before community development or redevelopment is

permitted.

The size of the school site is only partially related to the size of the school plant and the required area for such services as parking, deliveries, and safe bus-loading zones. The size must also "offer the maximum service for the educational program concerned." Site size is related, as well, to future building expansion and to net usable playground space per child. Full community use of the site during after-school hours for such activities as tennis, baseball, volleyball, basketball, swimming, track and field, football, and soccer are also important considerations. A useful "rule of thumb" allowing fulfillment of these educational and community objectives would be to provide elementary (K-6) school sites of up to 550 square feet per child enrolled at the proposed ultimate size of the school. For an elementary (K-6) school expected to grow to about 825 pupils, this would mean that a site of ten acres would be desirable.

School Plant User Requirements

In Part III of our Report, we propose to describe fully the specific areas needed to fulfill the educational objectives and functions of an elementary (K-6) school. At this point, we shall simply list these required ares, describing each only very briefly. This is done to provide a basis for the simulation of our recommendations in relation to the Metropolitan Toronto School Board's Ceiling Cost Formula for 1967 in Chapter VII. The required areas are as follows:

General learning areas (instead of enclosed classrooms),
Kindergarten (and junior kindergarten where approved),
Music room,
General purpose area (gymnasium),
Library materials centre,
Counselling centre,
Auxiliary areas

1) administrative
2) health center
3) staff lounge
4) grounds,

Service areas.

General Learning Areas

Instead of an enclosed-classroom design with each classroom 875 or 900 square feet in size, we advocate the clustering of two to eight or more classrooms in an open area with a flexible interior partitioning system. The most predominant feature of much of an elementary school's interior area would be its openness. There would be a series of open spaces. Because of longer structural spans and a completely flexible partitioning, lighting, mechanical, casework, and furniture arrangement system, many different sizes and shapes of teaching and learning stations could be provided within each zone. Some traditional corridor space might be incorporated in these open clusters. Each of these open cluster or general learning areas could contain various sizes of teaching stations, learning or project centres, seminar areas, a teacher preparation area, pupil washrooms, and outdoor clothing casework facilities. Educational objectives connected with individual learning, continuous progress, and co-operative teaching could be more easily attained in these flexible general learning areas. Each general learning area would bind pupils and teachers very closely together in a "school within a school" arrangement. As we will indicate more fully in Chapter VIII, it is essential that each general learning area contain a "common participation area" or "group participation common" in its centre.

The essential component sections of a general learning area are as follows:

1) teaching stations of approximately 750 square feet each, divided from other parts of the general learning area by a flexible partititon or casework system,

2) a common, or central participation area of about 250 square feet per teaching station, serving the learning and teaching functions of the general learning area,

3) a small enclosed project or seminar room of approximately 150 square feet, which is acoustically isolated, yet visually connected with the rest of the area,

4) a teacher workroom and academic storage room, with an area allotment of approximately seventy-five square feet per person, which ideally might adjoin or be located adjacent to the seminar room suggested in (3) above and which should contain working space for every regular teacher in the general learning area, plus one extra (intern teacher's) working space for every four regular teachers,

5) other facilities, such as pupil washrooms, storage for outdoor clothing, and mechanical and service facilities. (Circulation patterns within the general learning area and in relation to the rest of the school and outside must also be considered in developing such a design.)

Kindergarten and Junior Kindergarten

Following current practice, we recommend that a junior kindergarten containing twenty pupils be assigned 1,000 square feet, and a senior kindergarten containing thirty pupils, 1,200 square feet, including the required washroom, outdoor clothing, and storage facilities. When more than one kindergarten is required, the rooms might be adjacent, and,

by means of a flexible partition system, share some common facilities or central participation space, thus reducing the overall area requirements of a kindergarten complex.

Music Room

Because of considerations advanced in Chapter X, we favour a more intensive music program, with the introduction of instrumental music at the elementary (K-6) school level. For very obvious reasons, principally acoustical, open general learning areas cannot be used for a music program. The Study recommends a separate music room of 1,200 square feet.

General Purpose Area

With the assignment of music to a suitably enclosed music room, the general purpose area could be used principally as a gymnasium. Like the music room, the general purpose area should be enclosed and located away from quieter areas of the school. The general purpose room floor area recommended by the Department of Education is 2,500 square feet for the size of school described here. We believe 2,000 square feet of floor area would suffice, but that the Department of Education would not approve the legislative grant for this smaller area. Space, in excess of either allotment, is required for athletic equipment storage, dressing rooms, kitchen, and stage and chair storage. We recommend a portable or removable stage arrangment. A second gymnasium of 2,000 square feet adjacent to the first is very likely to be required when the pupil enrolment reaches the equivalent of sixteen traditional classrooms, and is certain to be needed at a twenty-classroom enrolment size.

Library Materials Centre

For the educational reasons advanced in Chapter XII, greatly enlarged and improved library materials centres are required in our elementary (K-6) schools. At the present time, a centre consisting of reading and reference-resource sections, enclose project areas, and a teacher office and workroom area are basic requirements. We recommend an area of 4,000 square feet for the immediate present, with provision for gradual increases in future years.

Counselling Centre

It now seems well accepted that cases of learning disability and social maladjustment should be identified and remedied in the early school years. Yet, traditionally, very little area has been provided in elementary (K-6) schools for the extremely important work of counselling. To perform this work, the school requires a guidance and counselling space of at least 400 square feet. We suggest this figure as a present area allotment which should be increased as counselling services expand.

Auxiliary Areas

a) Administration An allotment of 900 square feet should provide adequately for the functions of an elementary (K-6) school office. In addition, we recommend a small conference room of 150 square feet, located preferably, in such a way as to serve both administration and guidance purposes. A central administration and school supply storage area of about 375 square feet is also required.

b) Health Centre Such a centre in an elementary (K-6) school requires an area of 450 square feet.

c) Staff Lounge For a school growing from approximately 550 to 825 pupils, a common staff lounge, including kitchenette and outdoor clothing facilities, requires an area of approximately 850 square feet. Men's and women's washrooms, adjacent to but not entered from the lounge, will require approximately 200 square feet.

d) Grounds Our recommendations for grounds in connection with an elementary (K-6) school are contained in Chapter XIV. They need not be enlarged upon here.

Service Areas

As was explained earlier in this Chapter, the Ceiling Cost Formula allots, for service purposes, an area equivalent to six square feet per pupil. Our recommendations concerning this space allotment are to be found in Chapter XV.

CHAPTER VII

THE FUNCTIONAL SCHOOL AND THE CEILING COST FORMULA

Introduction

Throughout our Study we have considered our requirements in the light of the Ceiling Cost Formula for School Construction in Metropolitan Toronto. At this point, a brief summary of this Formula will help the reader understand some of the complexities of school construction in Metro Toronto.

The annual budget for school construction in its entirety as prepared by the Metropolitan School Board, as well as each individual school project begun during the year, must be approved by the Metropolitan Toronto Council. Following the creation of the Municipality of Metropolitan Toronto by the Provincial Legislature's Bill 80 in 1953, it soon became apparent that an inordinate amount of time would be spent by the Metropolitan Council in reviewing each individual school project, and that the efforts of the council in so doing would be a duplication of work at the Metropolitan School Board. Consequently, in 1954, an agreement was reached between the Metropolitan Toronto Council and the Metropolitan School Board that, within the annually approved budget for school construction, the capital funds required for individual school projects would be approved by the Council provided such costs were within a ceiling cost formula.

Operation of the Ceiling Cost Formula, 1954-1966

In each year following 1954, either as part of the capital budget

negotiations or in advance of these negotiations, the Ceiling Cost Formula for the year was agreed upon by the Metropolitan Toronto Council and the Metropolitan School Board. The Formula provided a ceiling for the optimum area of a school and the size of its component parts, and a fixed sum of money per pupil space for elementary, middle, and secondary schools. Over the years, the Ceiling Cost Formula was adjusted to meet changes in approved facilities and rising costs. In providing a basic standard for the debenturing of funds for school construction in Metropolitan Toronto, it operated remarkably well.

Recent Difficulties

Certain difficulties during recent years indicated, however, that the form of the original Formula needed revision. During the year 1966, in particular, there was a wide variation in the unit cost (contract cost per square foot) of school construction throughout Metropolitan Toronto. It was becoming apparent that a formula based on a fixed unit cost was becoming less and less workable. Also, its application had become increasinglycomplex, as provision had to be made for such matters as borrowing against future additions and adding facilities other than classrooms. There was also a need for some means of distinguishing effectively between new buildings and additions, between small and large buildings, between the initial phases of a building and subsequent additions, between city core and suburban schools and sites, and between the substantial costs of developing a new school site and the relatively minor costs related to site changes accompanying an addition. Furthermore, recent trends in education were highly suggestive of the idea that future schools would be based less on the standard

classroom and more on a wide variety of instructional and learning areas with varying maximum capacities.

The Revised Ceiling Cost Formula, 1967

Effective January 1, 1967, the Provincial Legislature, by Bill 81, completely revised the political, administrative, and financial structure of Metropolitan Toronto. Its original eleven municipalities were reduced to six. These were to include five enlarged boroughs (Etobicoke, York, North York, East York, and Scarborough) and the city of Toronto. Similarly, the responsibilities of the Metropolitan Toronto School Board (its official name was changed by the Act) were greatly extended, giving the Board virtual financial control of education in the Metropolitan area. Only minimal discretionary financial powers were left in the hands of the six local boards of education.

To meet the new situation, a completely revised Formula was developed to take effect January 1, 1967. As was the case with its predecessor, the revised Ceiling Cost Formula represents an agreement for the current year between the Metropolitan Council and the Metropolitan Toronto School Board, and it provides the basic standard for school construction debenturing in Metropolitan Toronto.

In comparison with its predecessor, the 1967 document is, in general, a much more flexible instrument. It can be revised without destroying its basic structure. It is primarily an area formula operating within certain cost parameters. The application of the formula is described below in a table which demonstrates the approved method of calculating (a) total (net) approved area, and (b) total approved cost, of an elementary (K-6) school.

TABLE 1

THE CEILING COST FORMULA, 1967, FOR ELEMENTARY SCHOOLS, GRADES K-6

Approved Area

Instructional (Pupil capacity of proposed building x 37.5 sq. ft.)	
Ancillary and Administrative (pupil capacity at approved ultimate size x 19 sq. ft.)	
Service (pupil capacity at approved ultimate size x 6 sq. ft.)	
Total (Net) Approved Area (including corridors but excluding walls)	

Approved Cost

Contract Cost (above total approved area x basic cost 22.25 per sq. ft.)	
Architects' Fees (in accordance with Ontario Association of Architects' schedule of fees.)	
Equipment (pupil capacity of proposed building x $106.)	
Site (as approved)	
Contingencies (3% of contract cost)	
Total Approved Cost	

It is appropriate here to describe in more detail how each of the above area and cost items in applied in the 1967 Ceiling Cost Formula in Metropolitan Toronto. To illustrate the formula, we have assumed that an elementary (k-6) school will open in one of the boroughs in September, 1968, with an estimated enrolment of about 550 pupils. Population projections in this borough have indicated that the ultimate pupil enrolment will reach about 825 pupils in September, 1973.

Approved Areas

Instructional--Since the pupil capacity of the proposed school at its opening in September, 1968, will be 550 pupils, we apply the Formula

by multiplying this number by 37.5 square feet. This means that the allowance for instructional space is based on a number of square feet per pupil, and not on a specific number of classrooms, as in the previous formula. This will allow greater design freedom in planning variable kinds and sizes of learning areas.

Ancillary and administrative areas--The Formula firmly stipulates that in no case may the allowances made for ancillary and administrative areas be less than the facilities required for a 450-pupil school. In calculating the amount of these areas, the formula permits the borough boards at their discretion to calculate these areas at the ultimate size of the school (i.e., ultimate enrolment size), which in our example is 828 pupils. These areas could be calculated (with some minor and detailed reductions) at 828 pupils x 19 square feet. Furthermore, to accommodate emerging instructional trends which require more varied and flexible space, a borough board may request the Metropolitan Toronto School Board to allow some flexibility of interpretation in permitting some interchange of areas between instructional and ancillary areas. This might result in some instructional areas being defined as ancillary areas (or vice versa), and in some cases might permit a borough board to incorporate needed facilities in the opening year of the school rather than at a later time.

Services area--Similarly, the space allotted to service areas may not be less than the facilities required for a 450-pupil school. Like ancillary areas, service areas may be calculated in relation to the number of pupils attending the school at its ultimate size. (In this case, it would be based on an enrolment of 828 pupils.) The amount of space allotted for this purpose (six square feet per pupil) may not be used for any instructional or ancillary purpose, or for purposes of educational administration.

Approved Cost

Contract cost--This is a stated base cost (a contract cost per square foot). This amount is based on the building cost experience of the previous year, and it is used for budget purposes. Thus, school construction tenders which are found to have total costs within the Ceiling Cost Formula can be approved without delay. Where total cost based upon tender price exceeds total approved cost, a project will be reviewed by technical personnel at the Metropolitan Toronto School Board. On the recommendation of such technical personnel, the ceiling cost may be adjusted to each individual project and the actual unit cost of the tender, provided that the technical personnel shall remove from the cost any amounts required for facilities declared to be above an adequate standard for Metropolitan Toronto Schools. For the year 1967, the contract cost of a K-6 elementary school has been established at $22.25 per square foot of net area (excluding walls.)

Equipment costs--Under the previous formula, a bulk sum of money for equipment items was permitted for each new school. In recent years, this sum had proved inadequate, since it had been developed in relation to the prices and practices of 1953. In the 1967 Formula, a single per-pupil allowance for equipment of $106 is provided for a K-6 elementary school. This represents a noteworthy increase over past equipment allowances and compares very favourably with expenditures for this purpose in many other systesm. However, any thoroughgoing program of individualization which depends to a major extent upon computer-assisted instructional technology will call for much larger per-pupil equipment budgets.

By definition, an equipment item is one not included in the general contract. Moreover, it is one that is listed on the permanent inventory record of the school and, in general, is one that has a per unit cost of at least $25. The exception is furniture. All items of furniture--even thosewith a per-unit cost of less than $25--are defined as equipment. The equipment allowance is not intended to cover purchase of supply items.

Site development costs--The previous Formula, as we have seen, made no provision for varying site conditions and requirements throughout the Metropolitan area. The 1967 Formula, while it lists those site development costs which are "normally" included in the building contract, makes allowance for situations in which site development beyond this limit is needed. In such cases the Formula permits extra site development costs to be determined separately from the approved cost of the school on the proper submission of the need for such costs by the borough board. Such site applications are reviewed by the technical personnel of the Metropolitan Toronto School Board, and a recommendation is made as to the portion of the proposed costs to be approved for financing by debenture. Eventually, it is hoped to develop specific site standards.

Adjustments of Ceiling Cost

The 1967 Formula also includes provision for certain upward adjustments in cost. If the actual cost of a new school based upon the lowest acceptable tender should exceed the total approved cost under the Formula, perhaps because of special circumstances at the time of tendering, such plans and specifications will be reviewed by technical personnel at the Metropolitan Board. The approved costs may be adjusted upward with respect to all tenders submitted, provided there is removed

from the costs financing required for facilities declared to be above an adequate standard for Metropolitan Toronto Schools.

Rehabilitation of Schools

The new Ceiling Cost Formula likewise defines the processes to be followed in those cases where older schools need rehabilitation. Readers who are interested in this may obtain the necessary information by referring to the Formula.

Simulation of the SEF User Requirements for an Elementary (K-6) School into the Metropolitan Toronto School Board's Ceiling Cost Formula, 1967

Because the Ceiling Cost Formula is primarily an area (square feet) formula, this simulation will deal exclusively with area. The purpose of this exercise is to show in detail how the SEF user area requirements relate to the maximum area allotments attainable under the current Ceiling Cost Formula. Some implications of this comparison are then set forth.

Assumption Concerning Enrolment and Borough Board Policy

It is assumed for the purposes of this simulation that the elementary school will open in September, 1968, with an enrolment of 550 pupils, and that the enrolment will increase to 828 pupils by September, 1973. Increase beyond this size is not anticipated. The composition of the school by grade level is presented in Table 2 for the opening date and in Table 3 for the ultimate enrolments. (See next page for Tables 2 and 3.) The results of calculations of Formula allowance are also shown. In calculating the area allotments in Tables 4 and 5, it has been assumed that the borough board would apply for ancillary and service area allotments based on ultimate enrolment (783 pupils).

TABLE 2

PUPIL SPACES ALLOWED UNDER 1967 CEILING COST FORMULA
FOR A STANDARD SCHOOL AT OPENING, SEPTEMBER, 1968

Grade	Actual Enrolment	Number of Classrooms	Formula Allowance
Junior kindergarten . .	37	1	18.5
Kindergarten.	56	1	28
1	93	3	93
2	64	2	64
3	96	3	96
4	63	2	63
5	65	2	65
6	62	2	62
Opportunity class . . .	14 (Rating 16)	1	32.5
Total	550	17	522

TABLE 3

PUPIL SPACES ALLOWED UNDER 1967 CEILING COST FORMULA FOR
A STANDARD SCHOOL AT ULTIMATE SIZE, SEPTEMBER 1973

Grade	Actual Enrolment	Number of Classrooms	Formula Allowance
Junior Kindergarten . .	37	1	18.5
Kindergarten.	90	2	45
1	96	3	96
2	94	3	94
3	130	4	130
4	126	4	126
5	123	4	123
6	118	4	118
Opportunity Class . . .	14 (Rating 16)	1	32.5
Total	828	26	783

TABLE 4

AREA ALLOTMENTS AVAILABLE UNDER THE 1967 CEILING COST FORMULA: APPROVED AREA AT OPENING, SEPTEMBER, 1968

	Square Feet
Instructional Area (552 pupils x 37.5 sq. ft.). . . .	19,575
Ancillary Area (783 pupils - 16.5 Opportunity Class* x 19 sq. ft.)	14,564
Service Area (783 pupils - 16.5 Opportunity Class x 6 sq. ft.)	4,599
Total Net Area (exclusive of walls)	38,738

* For instructional purposes, the formula allows the full allotment of 32.5 pupils at 37.5 square feet per pupil in opportunity or other disability classes. However, for ancillary (19 square feet) and for service (6 square feet) area allotments, the formula allows only the rated number of pupils for each type of disability class. In this case, for a junior opportunity class the rating is 16 pupils (32.5 - 16.5).

TABLE 5

AREA ALLOTMENTS AVAILABLE UNDER THE 1967 CEILING COST FORMULA: APPROVED AREA AT ULTIMATE SIZE, SEPTEMBER, 1973

	Square feet
Instructional Area (783 pupils x 37.5 sq. ft.). . . .	29,350
Ancillary Area (783 pupils - 16.5 Opportunity Class x 19 sq. fot.).	14,564
Service Area (783 pupils - 16.5 Opportunity Class x 6 sq. ft.)	4,599
Total Net Area (exclusive of walls)	48,513

Simulation of the SEF Functional User Requirements

In this section, we propose to illustrate fully the areas required to accommodate SEF recommendations. The enrolment projections are identical to those used previously, namely,

At opening, September, 1968 . . . . . .550 pupils
At ultimate size, September, 1973 . . . . . .828 pupils

TABLE 6

SIMULATION OF SEF FUNCTIONAL USER REQUIREMENTS:
AREA AT OPENING, SEPTEMBER, 1968

Instructional Area Requirements	Square Feet
1 Junior Kindergarten	1,000
1 Kindergarten (senior)	1,200
3 General learning areas:	
14 teaching stations @ 750 sq. ft.	10,500
common areas--14 @ 250 sq. ft.	3,500
1 opportunity class @ 750 sq. ft.	750
3 seminar rooms @ 150 sq. ft.	450
2 teacher workrooms (for 18 teachers and interns including academic storage @ 75 sq.ft.per person)	1,350
Circulation allowance for instructional area	3,363
Sub-total, Net Instructional Area	22,113
Ancillary Area Requirements	
1 General purpose room.	2,500
athletic and community storage	450
dressing rooms--2 @ 200 sq. ft.	400
kitchen.	75
stage and chair storage.	200
6 1 Library materials center (including all sections, workrooms, project rooms, etc.).	4,000
1 Music room.	1,200
1 School administration centre.	900
1 Conference room	150
1 Guidance centre	400
1 Health Centre	450
1 Staff lounge (including kitchen, clothing storage)	850
Academic storage area(s)--central school storage.	375
Pupil washrooms	1,000
Staff washrooms	200
Circulation allowance for ancillary areas	4,157
Sub-total, Net Ancillary Area	17,307
Service Area Requirements	
(783 pupils - 16.5 Opportunity Class) x 6 sq. ft.	4,600
Net Area at Opening, September, 1968	44,020

TABLE 7

SIMULATION OF SEF FUNCTIONAL USER REQUIREMENTS:
AREA AT ULTIMATE SIZE, SEPTEMBER, 1973

Instructional Area Requirements	Square Feet
1 Junior Kindergarten	1,000
2 Senior kindergartens @ 1200 sq. ft.	2,400
4 General learning areas	
22 teaching stations @ 750 sq. ft.	16,500
common areas--22 @ 250 sq. ft.	5,500
1 opportunity class @ 750 sq. ft.	750
4 seminar rooms @ 150 sq. ft.	600
4 teacher workrooms (for 28 teachers and interns including academic storage @ 75 sq. ft.perperson)	2,100
Circulation allowance for instructional area	5,163
Sub-total, Net Instructional Area	34,013
Ancillary Area Requirements	
1 General purpose room	2,500
1 Gymnasium	2,000
athletic and community storage	650
dressing rooms--2 @ 400 sq. ft.	800
kitchen.	75
stage and chair storage.	200
1 Library materials centre (including all sections, workrooms, project rooms, etc.).	4,000
1 Music room	1,200
1 School administration centre.	900
1 Conference room	150
1 Guidance Centre	400
1 Health centre	450
1 Staff lounge (including kitchen, clothing storage)	850
Academic storage area(s)--central school storage	375
Pupil washrooms	1,500
Staff washrooms	200
Circulation allowance for ancillary areas	4,063
Sub-total, Net Ancillary Area	20,313
Service Area Requirements	
(783 pupils - 16.5 Opportunity Class) x 6 sq. ft.	4,600
Net Area at Ultimate Size, September, 1973	58,926

Comparison of Areas Required by SEF Recommendations with Area Allowance Permitted under the 1967 Ceiling Cost Formula

In Table 4 we saw that the Ceiling Cost Formula for 1967 allows an approved net area of 48,513 square feet using our simulated pupil enrolment statistics. Using the functional areas required in the SEF recommendations, the total net area is 58,926 square feet. This represents a difference of 10,413 square feet (net--exclusive of walls), or 12.8 square feet per pupil calculated on the Formula allowance of 783 pupils.

The differences between the SEF recommendations in net area and the approved areaspermitted by the 1967 Ceiling Cost Formula may be further broken down for purposes of analysis as shown in Table 8.

TABLE 8

COMPARISON OF NET AREA REQUIREMENTS OF SEF RECOMMENDATIONS AND APPROVED AREA ALLOWED BY 1967 CEILING COST FORMULA AT ULTIMATE SIZE OF SIMULATED SCHOOL

	SEF User Requirement Recommendations (in sq.ft.)	Approved Area Under 1967 Ceiling Cost Formula (in Sq.ft.)
Instructional Area	34,013	29,350
Ancillary Areas.	20,313	14,564
Service Area	4,600	4,599
Net Area of School at Ultimate Size, Sept., 1973	58,926	48,513

Therefore, the SEF recommendations fully applied would require these additional per pupil space allotments:

For Instructional Areas (43.4 sq. ft. - 37.5 sq. ft.)	5.9 sq. ft.
For Ancillary Areas (25.9 sq. ft. - 19 sq. ft.)	6.9 sq. ft.
For Service Areas (6 sq. ft.)	no change
Total Additional Net Area Required (Per-pupil Basis)	12.8 sq. ft.

Rationale for an Increased Area Allotment

As seen in Table 8, the full implementation of the SEF user requirement recommendations would result in an increase of approximately 10,500 square feet of net area for an elementary K-6 school in Metropolitan Toronto, growing to an ultimate size of 828 pupils. This increase, as summarized in Table 8, amounts to 12.8 square feet (net) per pupil above the current Ceiling Cost Formula area allotment of 62.5 square feet (net) for an elementary K-6 school.

It is recommended that the Metropolitan Toronto School Board consider ways and means of attaining these area objectives.

The main reasons for the SEF recommendations and the need to increase the area allotment of an elementary K-6 school are briefly recapitulated in the following sections.

Educational functions and user requirements—It would be repetitious here to enlarge at length on a theme we have constantly stressed in this Report: that educational requirements should be the major factor in determining necessary facilities. Over a six-month period, we have studied seriously the educational needs of the K-6 elementary school. We have related these needs to the present and the future. Our findings represent an overview of the research literature, as well as the considered opinions of the experienced educational personnel represented on our educational committees. We firmly believe that if we are to emphasize the learning needs of each individual child, more interior space, and more variable and flexible types of interior space, are needed in our elementary K-6 schools.

In our opinion, the continuation of standard school design practices based on the traditional classroom and on educational concepts opposed

to change will result in exorbitant rehabilitation costs within a very fiew years. School buildings should be designed to facilitate educational change. Only schools which are designed in accordance with this principle can meet future educational requirements.

A changed role for elementary schools and their teachers: - Traditionally, elementary schools have been characterized by enclosed classrooms, a high pupil-teacher ratio, and a lack of specialist teachers. They have operated under the theory that an elementary school teacher should be "all things to all pupils." Over the years, this outlook has meant fewer upward area adjustments at this school level than at those higher school levels where teacher specialization and more varied and specialized teaching and learning areas are predominant features. Our recommendations are diametrically opposed to those design practices and to all educational theories which militate against change at the elementary school level.

Additional or different kinds of areas--Such areas account in large measure for the increase of area shown in Table 8. These areas may be listed as follows:

1) a considerably enlarged library materials centre,

2) a "common" or central participation area, a small seminar room, and a teacher workroom, together with an academic storage room--all serving the learning and teaching functions of each general learning area,

3) a music room

4) a guidance and counselling area,

5) a small conference room for the administration area,

6) dressing rooms for the general purpose room.

We suggest that a thorough annual review commencing in the autumn of 1967 be undertaken by the Metropolitan Toronto School Board with a view to finding ways and means, over the next few years, of obtaining the objectives and area increases recommended by the SEF study. Among the many matters to be considered by such annual reviews should be the kindergarten area where certain restrictive interpretations of the Ceiling Cost Formula exist.

We believe that, if careful and throughful architectural design practices are followed, the overall area increase of 12.8 square feet per pupil will be considerably reduced. Conversely, poor design practice might increase this amount. The best and most economical school designs will be those where the architect has studied fully and understands the educational functions to be served. The educator has the responsibility of detailing these functions as specifically and as completely as possible.

Summary

The Ceiling Cost Formula, from its inception in 1954 to its revision in 1966, sought to provide a simple and convenient arrangement for the day-to-day management of annual funds designated for school construction purposes by the Metropolitan Council. It was based upon a traditional concept of the school as a series of fixed rooms of well established size. Owing partly to practical difficulties and partly to changes in educational thinking during the late fifties and in the sixties, it became more and more difficult to apply the Formula. In 1966, the Formula was changed from a room basis to an area-per-pupil basis.

The selection of an area-per-pupil figure was based on an

assessment of schools already built or in the architectural design phase, with a reassessment of the "class" size from 35 to 32.5 pupils. It was recognized at the time of the 1966 reassessment of the Metropolitan Toronto School Board Ceiling Cost Formula that the SEF Academic Study should be oriented toward the provision of a realistic academic basis for the Ceiling Cost Formula. However, the Study (which commenced on September 1, 1966) had no output to contribute to the 1966 Formula deliberations.

The area and spatial functions defined and recommended in this Report have been developed within the context of the evolving directions of our society's educational and skill requirements and of the financial realities of public education in Metropolitan Toronto. In recommending an increase of floor space allotment per child from 62.5 to 75.3 square feet, it has been assumed that it is the will of the public and their representatives in the Metro Toronto area that their educational systems should be capable of maintaining and extending the community's position of leadership in commerce, industry, and scholarship while at the same time encouraging growth in each child.

Part IV

Composition of Groups Associated with Buildings

There are of course a few Boards of Education in the Province of Ontario that employ their own Architectural and Engineering Groups but most Boards lean heavily on the Department of Education's staff for guidance. However, for the purposes of this report, the Groups mentioned in Part III are continued with:-

Division of School Planning and Building Research is composed of:-

1 Research Architect
1 Assistant Research Architect (post secondary projects)
1 Assistant Research Architect (elementary and secondary projects)
2 Quantity Surveyors
4 Architectural Research Assistants
2 Designers
1 Draftsman
1 Secretary
2 Clerk/Stenos

TOTAL BUDGET FOR 1967-68 = $198,000

The School Plant Approvals Office is composed of:-

3 Architectural Advisers
2 Engineering Assistants
1 Approvals Officer
1 Secretary
4 Clerk/Stenos

TOTAL BUDGET FOR 1967-68 = $90,500

Part V

Status of the Groups

The Division of School Planning and Building Research and the School Plant Approvals office are part of the School Business Administration Branch of the Ontario Department of Education. The Heads of both sections report direct to the Superintendent of Architectural Services, a new purely Administrative position created to take care of the increasing administrative load.

The Head of the School Planning office also answers direct to (i) the Assistant Deputy Minister (Administration) in matters relating to the capital project program of the Department, and (ii) when necessary, to the Minister of Education regarding matters relating to design, construction and costs.

The SEF Group reports to an Advisory Committee which is composed of Educators, Trustees, Architects, Engineers, University and Department of Education representatives. The Advisory Committee reports directly to the Metropolitan Toronto School Board.

Study of Educational Facilities (SEF) Group

1 Technical Director (Architect)

1 Academic Director (Educator)

1 Executive Officer (Education Research Specialist)

2 Senior Architects

3 Research Assistants (Educators)

1 Quantity Surveyor

1 Programer (Time and motion studies etc., for whole project)

CONSULTANTS:- Structural, Mechanical, Electrical Engineering firms

2 Acousticians

1 Industrial Designer

TOTAL BUDGET FOR 1966-69 = $600,000 (this figure will be increased in the near future)

Part VI

Range and Direction of Activity (SEF Activity is already included in previous pages)

(a) Major Objectives

Both the Department of Education Architectural Groups are conscious of the need to provide school buildings that are functional, economical and provide an environment conducive to learning.

The tremendous growth of the Ontario school population, changing teaching methods, and a more enlightened approach to common problems by the specialists involved, has made the work of these two offices extremely interesting. With flexibility being the key to solving problems caused by constantly changing methods, with a need for economy being more necessary now than ever before because of increased costs in labour and materials, and with larger schools being built to cater for the needs of whole school populace, the major objective would appear to be providing better schools at lower costs.

(b) Major Activities

Particularly when carrying out research for new facilities, the School Planning Group co-operateswith the Educators so that proper information is produced to provide these functional, economical units.

These studies have involved matters ranging from the use of space, to the revision of procedures. A good example of this was witnessed by the program for changing the grant structure on the capital cost of buildings.

Appendix E shows the list of publications produced by the group to date, together with a list of projects presently being researched.

Appendix E

Brochures Published and Research being undertaken by the Division of School Planning and Building Research

Published

1. School Design Forum - a report on seminars
2. Library Materials Centres for Secondary Schools
3. Physical Education Facilities for Secondary Schools
4. Business and Commerce Facilities for Secondary Schools
5. Guidance Units for Secondary Schools
6. Rehabilitation and Renovations of Schools
7. Site Development - K to 6 Schools
8. Guidelines for Planning for Colleges of Applied Arts & Technology

FACILITIES BEING RESEARCHED OR PROCESSED FOR PUBLICATION

Laboratories:
- (a) Science
- (b) General Science, Physics and Biology
- (c) Combination, Science and Geography
- (d) Chemistry
- (e) Greenhouse Facilities

Workshops:

- (a) Electricity
- (b) Sheet Metal
- (c) Drafting
- (d) Woodworking
- (e) Auto Mechanics
- (f) Welding
- (g) Electronic
- (h) Air-conditioning and Refrigeration
- (i) Machine Shop
- (j) Industrial Physics
- (k) Auto Body
- (l) Graphic Arts
- (m) Industrial Chemistry
- (n) Girls Occupational
- (o) Boys Occupational

Home Economics:
- (a) Foods and Clothing
- (b) Textiles and Clothing
- (c) Foods and Nutrition

Language Laboratories

Classrooms (Elementary)

Library Resource Centres (Elementary)

General Purpose Rooms

Schools for Mentally Retarded Children
- (a) School for 80 Pupils
- (b) School for 35 Pupils

Classrooms for Mentally Retarded Children
- (a) Junior (5-10 years of age) Group of 10 Pupils
- (b) Intermediate (10-13 years of age) Group of 10-11 Pupils
- (c) Senior (14-18 years of age) Group of 10-12 Pupils

Classrooms for Emotionally Disturbed Children (8-10 Pupils) (Elementary Only)

Classrooms for Neurologically Impaired Children (8 Pupils) (Elementary Only)

Classrooms for Gifted Children (25 Pupils) (Elementary Only)

Opportunity Classrooms
- (a) Primary (12 Pupils) (6-10 Years)
- (b) Junior (16 Pupils) (10-13 Years)
- (c) Senior or Intermediate (16 Pupils) (Up to 16 Years)

Facilities for Colleges of Applied Arts and Technology are also being researched.

PROJECTS BEING CO-ORDINATED WITH THE ONTARIO DEPARTMENT OF PUBLIC WORKS

(Note:- The general legislative grant structure does not apply to these projects. However, the Treasury Board of Ontario approves the costs in all cases.)

Provincial Institute of Mining, Haileybury, Ontario.

Northern College of Applied Arts and Technology (Northern Ontario Institute of Technology), Kirkland Lake, Ontario.

Provincial Institute of Trades and Occupation, Toronto, Ontario.

Provincial Institute of Automotive and Allied Trades, Toronto, Ontario.

Provincial Institute of Trades, Toronto, Ontario.

St. Clair College of Applied Arts and Technology, Windsor, Ontario.

Ontario Vocational Centre, Welland, Ontario.

McArthur College of Education, Kingston, Ontario.

Teachers' College, Ottawa, Ontario.

St. Catharines Teachers' College, St. Catharines, Ontario.

Stratford Teachers' College, Stratford, Ontario.

Sudbury Teachers' College, Sudbury, Ontario.

Ontario School for the Deaf, Belleville, Ontario.

Ontario School for the Blind, Brantford, Ontario.

Report on School Building in Alberta

Part I

Level of Investments in School Building

The extent of investment in school buildings is indicated by the following table:

		School Buildings in thousands of $	G.N.P. in millions of $	percent of G.N.P.
	1961	20,837 --	37,471 --	.056%
	1962	42,744 --	40,575 --	.105%
	1963	46,540 --	43,424 --	.107%
	1964	23,644 --	47,403 --	.050%
	1965	34,367 --	51,996 --	.066%
Est.	1966	52,000 --		
Est.	1967	62,500 --		

The expenditures for school buildings pertain to accommodation for elementary and high school grades.

In addition to these, financial support is given to technical institutes, vocational training schools, junior colleges, and universities. It is significant that committed expenditures for vocational education in the past five years amounts to over 125 millions.

Part II

Administrative and Financial Background to School Building

School Boards prepare and submit statements to an appointed central School Buildings Board concerning their enrolments and needs for accommodation. The Board examines the requests and certifies the extent of building need and the amount of financial support from

public funds. Another provincially-appointed body, The Local Authorities Board, considers applications from school boards for borrowing money. Debenture funds are secured through a provincial organization known as The Municipal Financing Corporation.

School accommodation is in two classifications:

1. The largest part of the instructional space including the gymnasium, library and laboratories, as well as administrative area and other non-instructional areas that are recognized by the Buildings Board for financial support or debt servicing from provincial funds.
2. A smaller unapproved area may represent a board's desire for additional space. The cost of this is paid for directly at the local level.

In respect of public financing it is noted that all assessable property is liable to a provincial school tax of 26 mills. This money along with legislative appropriations is placed in a central School Foundation Program Fund and disbursed by the Department of Education for various phases of school operation according to specified schedules. One section provides that funds shall be paid to school boards to meet annual debenture obligations consequent of borrowing to build approved space. The allowance per square foot of such areas is $16.00. If contract prices of construction exceed this figure the boards may assume additional debenture borrowing through the Municipal Financing Corporation at their own expense.

Unapproved additional space is financed at the board's own expense and may be paid out of current revenue or short-term bank loans.

Such financing of excess costs or area at the local level is effected by the board's authority to request local tax levies which are supplementary to the equalized provincial levey of 26 mills referred to earlier.

There are some other forms of revenue. For vocational education in the high schools the federal government has shared with the provincial government the total cost of accommodation and approved equipment for schools or sections thereof designed to offer vocational education. In addition to this support the federal government has also contributed capital support on behalf of Indian pupils at the public schools. Special provincial grants are also provided for building accommodation for mentally retarded children.

Part III

National Bodies

This category is interpreted as applicable to Alberta as a province. In the province there is a School Buildings Board of five members appointed by the government. Included on the board is an architect from the Public Works Department, a member from the Treasury Department, a member from the Curriculum Branch and another from the Administration Branch of the Department of Education. The fifth member has a background of experience as a school superintendent and he serves as a co-ordinator of school planning. The Board considers applications for buildings, studies projections of enrolments, examines sketches, makes suggestions for building and renovations, and indicates the extent of accommodation for which approved financial support is established.

In the Department of Education there is a Buildings Branch comprised of a supervisor, plans examiners, and building inspectors. This staff examines working drawings, analyses spaces and costs, and confers with architects, boards, and authorities; with health authorities and fire commissioners. It prepares a handbook of regulations or guidelines pertinent to building requirements in respect to safety precautions, width of corridors, height of ceilings,

types of materials, and many other matters. It also examines tenders, recommends the awarding of contracts, and analyses the total contract price including architects' fees.
The Minister approves the contracts for building.

To provide further public and professional advice, there is a Provincial Advisory Committee on School Planning and Construction which offers recommendations to the Minister concerning building regulations, long-range planning, and financial support. It consists of representatives from the Architects' Association, the provincial assocations of the trustees, of the teachers, and of the urban and the provincial school superintendents. In addition the personnel of the School Buildings Board are also members of the Advisory Committee which is under the chairmanship of the Director of School Administration who is also chairman of the School Buildings Board. It is thus intended that there be close liaison between the two bodies and throughout the whole fabric of organization in respect of school buildings there is opportunity to hear from people in administration, curriculum development, supervision of instruction, and preparation of architectural specifications and estimates.

A special division of Vocational Education operates for the approval of accommodation and equipment for vocational courses. The group has worked closely with federal authorities giving financial assistance and also with the Buildings Board for the joint use of facilities and the total inter-relationship of academic, general, and vocational education.

Part IV

Composition of Groups Associated with Buildings

(a) The School Buildings Board is legislatively constituted and comprised of:

1 representative from the Curriculum Branch

1 representative from the Administration Branch

1 co-ordinator (ex-school superintendent) associated with the Buildings Branch

1 architect from the Public Works Department

1 financial advisory from the Treasury Department

(b) The Advisory Committee on School Planning and Construction.

This group of 11 members is comprised of:

5 members of the School Buildings Board

1 member from the provincial teachers' association

1 " " " " trustees' "

1 " " " " association of provincial school superintendents

1 " " " association of locally-employed urban school superintendents

2 members from the provincial architects' association - one employed by a city board and one in private practice

(c) The Buildings Branch.

1 supervisor

2 examiners of school plans

2 inspectors of building projects

All of these people have a considerable background in practical experience; they are employed full-time in the Department of Education. The cost of operation including travelling expenses and secretarial assistance approximates $45,000. (annually) This Buildings Branch has been a feature of the Department for a long time and has given valuable direction to types of buildings and grant support.

As the need for buildings increased the Buildings Board was established which is not wholly constituted from personnel of the Department of Education. Attached to it is a full-time secretary

with a background of contrasting experience that facilitates his work in analysing requests from boards. Both he and the co-ordinator visit school districts, examine building needs, interview school officials, and receive delegations. The cost of operation of this Board including travelling and stenographic assistance approximates $27,000. (annually)

The Division of Vocational Education is comprised of a Director and several assistants who give attention to approvals of building, special services, and equipment in the sections of building devoted to the development of trained manpower or programs that are terminal or articulated with apprenticeship or courses in technical institutes.

Part V

Status of the Group

(a) The School Buildings Board is to a large extent an autonomous body which maintains close liaison with the Minister; as said before, it is established according to legislation that indicates its composition and purpose in the following manner:

"The School Buildings Act"

3. (1) "The Lieutenant Governor in Council may appoint a board consisting of five members, which shall be known as the School Buildings Board."

5. (1) "The Lieutenant Governor in Council may make regulations to govern the board in granting approval of a school building project including the preparation and development of the site, the service connections, a water system, sewage disposal and the furniture and fixtures relative to the project."

(b) The School Buildings Board is constantly called upon to provide information to the Minister concerning building desires of various school boards. It is responsible for preparing regulations pursuant to the School Buildings Act which may be approved by the Minister. It is the authorized body that recognizes needs for accommodation in various school jurisdictions and authorizes the amount of financial support from public funds.

Part VI

Range and Direction of Activity

(a) Major Objectives

(i) To provide as quickly as possible for the necessary accommodation of increasing school population.

To ensure observance of precautions in respect of health and safety and principles related to functional use of the space according to new curriculum developments.

(ii) Considerations include regard for larger libraries, special study-halls, language and science laboratories, science experience and activity rooms, and space for special subjects such as industrial arts, home economics, and commercial electives. In addition there has been increasing regard for vocational facilities, instructional materials centers, audio visual aids, ancillary rooms for fine arts, and special areas for team-teaching.

(iii) Increased functional efficiency is promoted through attention to requests of teachers and supervisors and implementation of ideas proposed by architects and those propounded in various periodicals.

(iv) The immediate demands militate against continued attention to overall planning. It is intended that the Co-ordinator might study new ideas and bring these to the attention of the members of the committees.

(b) Activities Carried Out

1. Personnel from building committees have occasionally visited buildings in centers outside the province.

2. Various suppliers of materials, furniture and equipment have maintained much contact with architects and with members of the Buildings Branch.

3. Some summaries of research conclusions have been provided; some of these pertain to accommodation for libraries, materials centers, and fine arts.

Brief notes on school building programs in other provinces

PROVINCE OF MANITOBA

Since April, 1959, public school building in Manitoba has been financed by sale of debentures, money accumulated in reserve accounts or current revenue.

The Minister of Education authorizes the building after the request from the School Board has been reviewed by the Department's School Building Committee. The School Board is responsible for engaging the architect, raising the money and checking on the completion of the building.

The architect's plans are reviewed by the department's architect who is a member of the Building Committee. Plans are also checked by the Fire Commissioner for Manitoba.

The consent of a majority of resident electors for the area involved is required if the cost of the building is to be raised through the sale of debentures. At this point the financial position of the area is reviewed by the Municipal Board. If desired, the Finance Officer of the Municipal Board will help in selling the debentures.

PUBLIC SCHOOL CAPITAL EXPENDITURE - 1960 - 1965 FOR MANITOBA

PROVINCIAL GOVERNMENT OF MANITOBA

CAPITAL GRANTS

PUBLIC SCHOOL

Public School Boards Expenditure Out of Revenue	1960 1961	1961 1962	1962 1963	1963 1964	1964 1965	1965 1966
Elementary	2,041,144	2,173,153	2,006,701	2,442,124	1,699,398	1,775,308
Secondary	5,311,341	6,342,713	7,142,951	7,541,382	8,221,143	9,020,305
TOTAL	7,352,485	8,515,866	9,149,652	9,983,506	9,920,541	10,795,613
Manitoba Government Capital Grants	3,316,732	3,914,140	4,366,075	4,612,006	4,837,408	5,492,892

HIGHER EDUCATION

Man. Government Capital Grants to Higher Education						
University of Manitoba	4,851,100	1,782,350	2,485,100	3,484,860	3,200,000	3,066,577
Brandon College	672,313	263,585	-	-	1,494,402	69,700
Affiliated Colleges	35,450	142,013	169,821	248,137	231,169	187,230
TOTAL	5,558,863	2,187,948	2,654,921	3,732,997	4,925,571	3,323,507

Capital Expenditure out of Revenue for Higher Education not available within Department of Education

SCHOOL CONSTRUCTION

	Debentures Issued	New Buildings		Additions		
		Elem. Rooms	Sec. Rooms	Elem. Rooms	Sec. Rooms	Total Rooms
1 Apr. 1959-30 June 1959	6,024,350	242	36	74	33	385
1 July 1959-30 June 1960	19,233,100	156	860	110	137	1263
1 July 1960-30 June 1961	12,820,751	154	437	177	73	841
1 July 1961-30 June 1962	5,826,200	235	61	34	42	372
1 July 1962-30 June 1963	11,341,000	164	227	82	173	646
1 July 1963-30 June 1964	9,242,900	239	90	121	114	564
1 July 1964-30 June 1965	8,407,300	155	237	59	66	517
1 July 1965-30 June 1966	9,754,500	244	168	83	73	568
1 July 1966-31 Dec. 1966	5,144,500	51	104	76	53	284
	88,171,601	1640	2220	810	769	5439

Note: In addition to the above, additional building has been done as well as extensive renovations, the costs having been met by a special levy or use of reserve funds.

NUMBER OF NEW SCHOOLS

	Elementary Buildings	Secondary Buildings	Total Buildings
1 Apr. 1959-30 June 1959	23	1	24
1 July 1959-30 June 1960	20	56	76
1 July 1960-30 June 1961	20	39	59
1 July 1961-30 June 1962	12	5	17
1 July 1962-30 June 1963	13	10	23
1 July 1963-30 June 1964	17	3	20
1 July 1964-30 June 1965	15	8	23
1 July 1965-30 June 1966	15	3	18
1 July 1966-31 Dec. 1966	3	2	5
	138	127	265

PROVINCE OF NEWFOUNDLAND

From its portion of the grant each denomination makes allocations to school boards on account of proposed school buildings. In the case of large schools the allocation may be spread over a number of years. The school boards are responsible for raising the balance of the cost and for whatever financing may be necessary. The usual method of financing is short term, through the Commercial Banks. (Only two cases are known where financing has been done through debentures.) The school board raises money locally either through taxes collected by a local school tax authority, through fees or contributions from Church groups. Information is not collected on the cost of schools, consequently there are no records of cost.

A record is kept of the amount of public money expended. The money spent by the Provincial Government on school buildings from 1961 to 1966 is as follows:-

Year	High Schools	Elementary and all Grade Schools
1961-62	983,600	1,142,369
1962-63	944,100	1,092,620
1963-64	998,700	1,179,919
1964-65	993,200	1,131,800
1965-66	1,049,450	1,155,817

In the current year the vote for school building was doubled. The current estimates are $2,000,000.00 for High Schools and $2,000,000.00 for Elementary and all grade schools. It is expected that this vote will continue during the next 5 years, so that the total expenditure on school building by the Provincial Government in the next 5 years will be $20,000,000.00.

PROVINCE OF PRINCE EDWARD ISLAND

Elementary	Total Cost	Secondary	Total Cost
1960 - 61	$ 187,000	1960 - 61	$1,131,955
1961 - 62	52,000	1961 - 62	647,100
1962 - 63	104,000	1962 - 63	1,864,700
1963 - 64	96,000	1963 - 64	1,245,300
1964 - 65	298,000	1965 - 66	730,000
1965 - 66	1,183,500	1966 - 67	350,000
1966 - 67	737,000		
1967 - 68	4,000,000		
1968 - 69	4,000,000		
1969 - 70	4,000,000		
1970 - 71	4,000,000		
1971 - 72	4,000,000		

PROVINCE OF SASKATCHEWAN

Year	Elementary and Secondary Schools	Post-Secondary Buildings		Total
		Technical Institutes	University of Saskatchewan	
1960 - 61	$13,000,000	$ 647,000	$ 1,818,000	$15,465,000
1961 - 62	10,400,000	55,000	2,150,000	12,605,000
1962 - 63	13,360,000	4,079,000	1,424,000	14,863,000
1963 - 64	17,939,000	2,280,000	6,671,000	26,990,000
1964 - 65	21,154,000	132,000	8,085,000	29,361,000
1965 - 66	22,948,000	35,000	10,823,000	33,806,000
1966 - 67	26,000,000	1,500,000	14,800,000	40,300,000
1967 - 68	27,000,000	6,000,000	14,778,000	47,778,000
1968 - 69	22,000,000	6,000,000	13,919,000	41,919,000
1969 - 70	20,000,000	6,000,000	21,535,000	47,535,000

The above table does not take into account any investments that may have been made by private institutions. These in Saskatchewan would be very limited.

Administrative and Financial Background to School Building

Elementary and secondary schools are built by local school authorities which are the elected boards of school districts and larger school units and are financed out of taxes levied on real property by the local authority and out of capital grants made available by the provincial government. Provincial grant support varies generally with need, being greater where the taxable assessment per classroom is high. Building plans are developed at the

local level, but must be submitted for approval to the Department of Education where they are examined for their educational suitability and for conformity with regulations. Before approval is given, the Department must also be satisfied as to the need for building and the ability of the local authority to finance the project.

Technical Institutes are built by the provincial government with federal financial aid and operated by the Department of Education.

The University of Saskatchewan, while a state university, is administered by an autonomous Board of Governors. Plans for building are developed by the university administration under the direction of the Board of Governors which gives final approval to plans and lets contracts for building. The University derives its funds from provincial government grants, from loans in the form of debentures which are government guaranteed, and from voluntary contributions by interested organizations and individuals.

REFERENCES AND CREDITS

1. Division of School Planning and Building Reaseach, Ontario Department of Education, 44 Eglinton Avenue West, Toronto 12, Ontario

2. The Canadian Education Association, 151 Bloor Street West, Toronto 5, Ontario

3. Metro Toronto School Board, 175 College Street, Toronto 2B, Ontario

4. Montreal Catholic School Commission - Irnes Inc. (consultants) 700 Cremazie W., Montreal, Quebec

5. Alberta Department of Education, 10820-98 Avenue, Edmonton, Alberta

6. Manitoba Department of Education, 507-1181 Portage Avenue, Winnipeg 10, Manitoba

7. Newfoundland Department of Education, St. John's, Newfoundland

8. Prince Edward Island Department of Education, Charlottetown, Prince Edward Island

9. Saskatchewan Department of Education, Regina, Saskatchewan

10. Edmonton Public School Board, 10733-101 Street, Edmonton, Alberat

11. School Progress Magazine, 481 University Avenue, Toronto 2, Ontario

12. The Dominion Bureau of Statistics

13. "Quick Canadian Facts" published by Quick Canadian Facts Ltd., Box 699, Terminal A, Toronto 1, Ontario

14. "The Economy of Ontario" published by the Queen's Printer, Toronto, Ontario, 1966